

SPECIFICATION AMENDMENTS

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In the construction disclosed and claimed in U.S. Patent No. RE37,615, a plurality of mutually spaced sleepers 20 (Figs. 1 and 2) in the form of elongated nailing members are used with a subfloor layer 22 for supporting a layer of hardwood floorboards 24 that serve as a wear surface. One or more of the subfloor layers 22 are interposed between the sleepers 20 and the hardwood wear surface 24. The sleepers 20 also include compressible supporting pads 26, e.g., pads made of a suitable elastomer. In the floor system disclosed in the aforesaid patent, a fastening arrangement 30 is used to secure the sleepers 20 directly to a base 28 so that (a) the pads 26 are not precompressed, i.e., the pads are not compressed beyond the compression that results solely from the weight of the flooring system components carried by the pads, and (b) the sleepers 20 can deflect downwardly upon impact to the upper layer of the floor system but are restricted against upward movement beyond the initial static position of the pads. The fastening arrangement 30 includes holes 32 with counterbores 44 in the sleepers 20, floor-anchoring fasteners 34 with heads 40 that extend through the counterbored holes 32 into the base 28, and means 36 for limiting the depth of penetration of the fasteners 34 into the base 28 so that the downward driving forces applied via the fasteners do not precompress the elastomer pads 26. As disclosed in U.S. Patent No. RE37615, cited supra, the means 36 comprises a cylindrical plastic lubricating sleeve 36 which may but need not have an integral flange 42 (as shown in Fig. 9 of the patent) or be used with a separately formed flange in the form of a circular washer (Fig. 1). Counterbore 44 is sized to accommodate fastener head 40 and also flange 42. U.S. Patent No. RE 37615 teaches that the sleeve 36 may be made of Teflon or any other low friction material.

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DETAILED DESCRIPTION OF THE INVENTION

Figs. 1-3 illustrate a section of a floor system of the type disclosed in U.S. Patent No. RE37,615. The floor system comprises a plurality of mutually spaced attachment members in the form of the wooden sleepers 20 having the resilient pads 26 on their bottom sides and supporting at least one subfloor layer 22 on their top sides. The subfloor layers are secured to the sleepers by nails or other fasteners 24 34. The sleepers 20 are anchored to and supported by the base 28, typically formed of concrete. Overlying the subfloor layer 22 is the wood floor 24 which usually is made up of interlocked tongue and groove maple floorboards that are anchored to the subfloors by fasteners 25. The subfloor layer(s) 22 may take various forms, e.g., as disclosed in U.S. Patent No. RE37,615 and the prior art listed therein. Typically, the subfloor layer 22 is formed of 4'x8' plywood panels and has a uniform thickness of about ½ inch. The sleepers 20 typically have a cross-sectional height of about 1.5 inch, and a width of about 2.5 inch, and a length of either 4 or 8 feet. The sleepers are usually spaced apart about 12 inches, although that spacing may vary depending upon their width. The foregoing dimensions are not critical, and hence sleepers having a different height, width, length and spacing may be used.

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Each of the sleeper members 20 is provided with at least one, and usually two or more of the through holes 32 to accommodate the fasteners 34 and standoff sleeves 36. A counterbore 44 is coaxial with each hole 32 on the top side of the sleeper, so that each hole has a relatively small diameter bottom section 32 and a relatively large diameter top section 44. The bottom end of each counter bore has a flat annular surface 46.

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Referring to Figs. 7 and 8, for the purposes of this invention the powered driver, e.g., a Pneutek Model PT 1100, is provided with a modified form of bottom member 81 wherein the nozzle 82 has a bottom end section 96 characterized by a cylindrical outer surface terminating in an annular end face 100. The cylindrical section 96 has an outside diameter that is smaller than the diameter of the ~~countersinks~~ counterbores 66 of sleeves 34, so as to permit it to be inserted into those ~~countersinks~~ counterbores. However, the outside diameter of bottom end section 96 is not so large as to introduce a degree of lateral play that makes it difficult to center the nozzle in ~~countersinks~~ counterbores 66, since in the manual mode an off-center nozzle may result in the hammer 86 striking the head of the pre-positioned fastener off center; and in the automatic mode an off-center nozzle may result in the fastener being misaligned with the sleeve center hole 60, both situations being undesirable for obvious reasons. Preferably, the outside diameter of the bottom end section 96 of the nozzle 82 is about 0.015 to 0.036 inch less than the diameter of the ~~countersinks~~ counterbores 66. The driver nozzle bore 84 is coaxial with the center axis 98 of the nozzle's circular and annular end face 100 and has a diameter that exceeds the diameter of the fastener head by a small amount, so as to readily accommodate the fastener head 40. Preferably the bore 84 diameter exceeds the maximum diameter of the fastener head 40 by about 0.015 to 0.021 inch.

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A bore 92 for safety rod 94 is formed in the upper section of nozzle 82 eccentric to the bottom end section 96, so that the safety rod extends down along side of and close to the cylindrical outer surface of nozzle bottom section 96, whereby the outer or bottom end of the rod can engage the flange 62 of a sleeve 34 into which the nozzle is inserted. Rod 94 is biased outwardly by a spring 102. In its normal at-rest (extended) position under the influence of spring 102, the outer or bottom end of rod 94 does not project beyond the end face 100, but instead it is located short of that end face so that nozzle end section 96 may be inserted into ~~countersink~~ counterbore 66 of a pre-positioned sleeve 34 before the safety rod can engage the flange 62 of that sleeve. Additionally the relationship between the end face 100 of the nozzle and the end of safety rod 94 is such that when the rod engages flange 62, the end face 100 will be spaced from the bottom end wall 59 of the ~~countersink~~ counterbore 66 by a distance substantially equal to or less than the distance that the safety rod needs to be retracted in order to place the driver in condition for firing. By way of example but not limitation, if the depth of ~~countersink~~ counterbore 66 is 0.88 inch and the safety rod needs to be retracted 0.25 inch in order to place the driver in condition for firing, in its normal at rest position the outer end of safety rod 94 may be 0.50 inch behind end face 100.

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When a sleeve 36 is inserted into a hole 32 in a sleeper 20 or other member of like purpose, the bottom end of the sleeve will engage or be in near engagement with the base 28. When subsequently the bottom end section 96 of driver nozzle 82 is inserted into the sleeve ~~countersink~~ counterbore 66, the spring-biased safety rod 94 will engage the sleeve flange 62. The spring 102 acts on rod 94 to resist intrusion of the nozzle into the sleeve. Preferably the stiffness of spring 102 is such that the driver needs to be pushed down against the plastic sleeve flange 62 with moderate manual force in order to depress the safety rod 94 far enough to place the driver in condition for firing.

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In both the automatic and manual modes of operation, the sleeves are pre-positioned in the sleeper holes 32. It is preferred that when a sleeve is inserted into a sleeper hole 32, the bottom end 68 of the sleeve 36 will touch the upper surface 72 of the base 28 and the bottom side of the sleeve flange 62 will engage, or nearly engage, the surface 46 of the sleeper center bore 44. In both modes the driver nozzle is inserted into the ~~countersink-68~~ counterbore 66 of a pre-positioned sleeve and the safety rod engages the flange 62 of that pre-positioned sleeve. In the manual mode the head 40 of the fastener extends up into the nozzle bore 84. In the automatic mode, a fastener 34 fed from the magazine 90 is pre-positioned in hammer bore 84, and when the driver is fired its hammer 86 impacts that pre-positioned fastener and drives it down along bore 84 into the pre-positioned sleeve.

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In both modes, when the driver is fired, the hammer 86 of the driver impacts the head 40 of the fastener at a high velocity and with great force, causing the fastener to penetrate the underlying hard and dense base 28, whereby the fastener and the surrounding sleeve serve to position and anchor the sleeper to the base. The hammer 86 of the driver forces the fastener 34 into the concrete base 28 far enough to cause the fastener head 40 to be seated against the bottom wall 59 of ~~countersink~~ counterbore 66 and to lock the sleeve 36 tight against the base 28. However, because of the depth-limiting action of the sleeve 36 with respect to the sleeper, the fastener 34 cannot be driven into the concrete so far as to precompress the resilient pads 26. Further assurance that the fasteners are driven into the concrete the correct amount is provided by the fact that the stroke of the hammer 86 is limited. The limited stroke of the hammer also substantially eliminates any possibility that the hammer will crush the sleeve.

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Referring to Fig. 10, it will be seen that the fastener may be provided with a smaller head 40 and a washer 58 placed inside the ~~countersink~~ counterbore 66 of the plastic sleeve 36 and in engagement with a bottom end wall 59. The washer 58 is engaged by the fastener head 40 when the fastener 34 is driven into the base 28. The washer 58 effectively increases the diameter of the fastener head 40, assuring adequate bearing area for locking the sleeve 36 to the base 28.